Anil Kumar

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Education

University of Hyderabad **Telangana, India**
Ph.D, Computer Science **2015-2022**
Thesis: Evolving Hyperboxes for Enhanced Classification and Scalable Feature Subset Selection; Supervised by Dr. P.S.V.S. Sai Prasad (Associate Professor) [Pdf]

The objective of the work is to enhance a few data mining algorithms in the aspects of efficiency and scalability through granular computing.

- Researched and developed a simple architecture of Fuzzy Min-Max Neural Network (FMNN) learning model with the objective of scalability and enhanced classification performance.
- Developed scalable fuzzy-rough feature selection algorithms and an incremental fuzzy-rough feature selection algorithm with the objective of reducing the space complexity of fuzzy rough sets with the advantages of granulation of object space using FMNN as a preprocessing step.

University of Hyderabad **Telangana, India**
M.Tech, Artificial Intelligence **2013-2015**
Thesis: A Neural Network based Orthography to Pronunciation mapping of Indian and English; Supervised by Dr. S. Bapi Raju (Professor, IIIT Hyderabad)

- Worked on a connectionist model to address the issues in developmental reading disorder on Akshara letter learning in Hindi that has already been applied and examined in English and Chinese language.
- Implemented continuous recurrent back-propagation algorithm with online learning to train the network of large corpus of CVCV (bisyllabic), CVCVCV (trisyllabic) structure of Hindi.

Research Areas

Machine learning, Fuzzy Rough Sets, Granular Computing, Data Mining, Data Science & Big-Data Analytics

Industrial Experience

SEW Private Limited **Noida, India**
Research Scientist **Feb 2022 - Present**
Energy Disaggregation: Researched and developed ensembled (Machine Learning and Deep Learning) approaches that can predict real-time appliance level (AC, Refrigerator, Washing Machine etc.) energy consumption from total energy consumption (Advanced Metering Infrastructure (AMI) meters) and identify inefficient appliances and provide appliance-level feedback to the end users to help them understand their energy consumption.
Award: Excellence Award on July 2022 [Pdf]

Project Experience

Distributed Framework for Fuzzy Rough set Feature Selection for large scale Decision System; Supervised by Dr. P.S.V.S. Sai Prasad (Associate Professor) [Link]
Funded by DST: DST/ICPS/CPS-Individual/2018/579
Project Assistant **Jan 2019- July 2022**

- Developed a scalable fuzzy rough set-based feature selection approach using a novel way to design crisp discernibility matrix construction from knowledge derived from FMNN preprocessing step.
- The proposed approach obtained a significant reduction in space and computational time and established better scalability than state-of-the-art approaches.

Publications

Journals

Anil Kumar and P. S. V. S. Sai Prasad (2020), "**Scalable Fuzzy Rough Set Reduct Computation Using Fuzzy Min–Max Neural Network Preprocessing**", In: *IEEE Transactions on Fuzzy Systems*, **IF: 12.04, Indexing: SCI**, DOI: 10.1109/TFUZZ.2020.2965899.

Anil Kumar and P. S. V. S. Sai Prasad (2021), "**Incremental fuzzy rough sets based feature subset selection using fuzzy min-max neural network preprocessing**", In: *International Journal of Approximate Reasoning*, **IF: 3.81, Indexing: SCI**, DOI: 10.1016/j.ijar.2021.09.006.

Anil Kumar and P. S. V. S. Sai Prasad (2022), "**Enhancing the scalability of fuzzy rough set approximate reduct computation through fuzzy min–max neural network and crisp discernibility relation formulation**", In: *Engineering Applications of Artificial Intelligence*, **IF: 8, Indexing: SCI**, DOI: 10.1016/j.engappai.2022.104697.

Abimanyu Bar, **Anil Kumar** and P. S. V. S. Sai Prasad (2023), "**Coarsest granularity-based optimal reduct using A* search**", In: *Granular Computing*, **IF: 5.5, Indexing: ESCI**, DOI: 10.1007/s41066-022-003136.

Conferences

Anil Kumar and P. S. V. S. Sai Prasad (2019), "**Hybridization of Fuzzy Min-Max Neural Networks with kNN for Enhanced Pattern Classification**", In: *Advances in Computing and Data Sciences*, Ed. by Mayank Singh et al., Springer **Indexing: SCOPUS**, DOI: 10.1007/978-981-13-9939-8-4.

Anil Kumar and P. S. V. S. Sai Prasad (2019), "**Finding Optimal Rough Set Reduct with A* Search Algorithm**", In :*Pattern Recognition and Machine Intelligence*, Ed. by Bhabesh Deka et al., Springer, **Indexing: SCOPUS**,DOI: 10.1007/978-3-030-34869-4-35.

Doctoral Symposium

Anil Kumar and P. S. V. S. Sai Prasad (2021), "**Evolving Hyperboxes for Enhanced Classification and Scalable Feature Selection**", *In Proceedings of AIMLSystems, ACM*, New York, NY, USA. [Link]

Programming Languages

Matlab, R, Python, PyTorch

Reviewer

IEEE Transactions on Fuzzy Systems (IF: 12.25), IEEE Transactions on Cybernetics (IF: 19.11)

Teaching Assistant

Data Structure, Basic of Algorithms, Fundamental of Computer Science, Rough Set Theory and Fuzzy Rough Set Theory.

Certifications

Mathematics for Machine Learning: Linear Algebra (Coursera) , Machine Learning (Coursera)

Achievement and Extra-Curricular Activities

- Received excellence award at SEW Pvt. Ltd.
- Received best research paper award at University of Hyderabad (UOH) (Institution of Eminence).
- Cleared and Selected for GATE scholarship.
- Deliver Lectures in 2-days workshop on R programming & Python at TKR college of Engineering and Technology, Hyderabad.
- Attended Workshop on Machine learning & its Application on IIST, Trivandrum, Kerala (2014).
- Attended 2-days Workshop on Linear Algebra & Machine learning at UOH.
- Attended 1-day workshop on Application of Statistical Methods at UOH.
- Attended 12-days Workshop on "Design of Algorithm For Big Data Analytics" by GIAN at UOH.
- Mentor to conduct Artificial Intelligence classes at Backstage Pass Institute of Gaming and Technology, Hyderabad
- Organiser of IEEEXtreme Competition-2014 at UOH.
- Volunteer at IEEE Authorship Workshop titled "How to publish a Technical Paper with IEEE" held at UOH.
- Volunteer of TekSplash 2019 at UOH.
- Volunteer Internal Hackathon for Smart India Hackathon 2020 at UOH.

References

1. **P.S.V.S. Sai Prasad**, **Associate Professor**, School of Computer and Information Sciences, University of Hyderabad, Hyderabad - 500046, India, saics@uohyd.ac.in, +91-9704671047
2. **Salman Abdul Moiz**, **Professor**, School of Computer and Information Sciences, University of Hyderabad, Hyderabad - 500046, India, salman@uohyd.ac.in, +91-040-23134126
3. **K. Swarupa Rani**, **Professor**, School of Computer and Information Sciences, University of Hyderabad, Hyderabad - 500046, India, swarupacs@uohyd.ac.in, +91-040-23134020
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